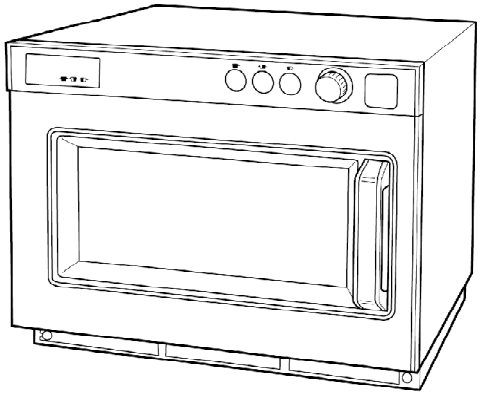
ORDER NO. MOD0108246C2

Service Manual

Microwave Oven

NE-2156 / NE-2146 / NE-1656



SPECIFICATIONS

Specifications

		NE-1656	NE-2146	NE-2156
Power Source :		230-240 V AC Single Phase, 50Hz		
Power Requirement :		2590W	3160W	
High frequency Output :	HIGH	1600W (IEC-705)	2100W (IEC-705)	
	MED	800W	1050W	
	DEF	340W	340W	
Frequency :		2450 MHz		
Timer :		NE-2146 25 Min. ····· HIGH 30 Min. ····· MED, DEF NE-2156 / NE-1656 15 Min. ····· HIGH, MED 30 Min. ····· DEF		
Outside Dimensions :		422 mm (W) × 508 mm (D) × 335 mm (H)		
Oven Cavity Dimensions :		330 mm (W) × 310 mm (D) × 175 mm (H)		
Weight :		30 kg		
Specification subject to change without notice.				

© 2001 Matsushita Electric Industrial Co., Ltd. All rights reserved.
Unauthorized copying and distribution is a violation of law.

⚠ WARNING

This service information is designed forexperienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country/AREA identifications shown below for your applicable product specification.
BPQ·····For United Kingdom EUG·····Continental Europe Countries

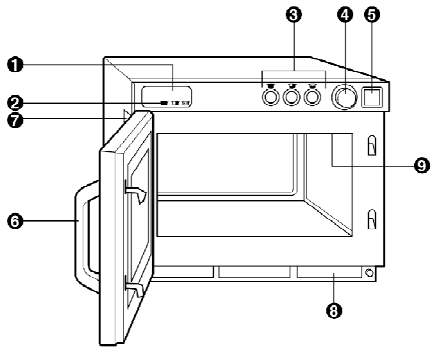
WARNING

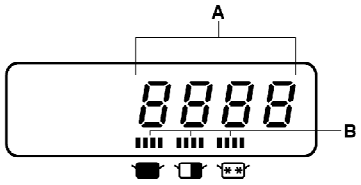
This products should be serviced only by trained, qualified personnel.

Panasonic®

1. OUTLINE DIAGRAM

NE-2146



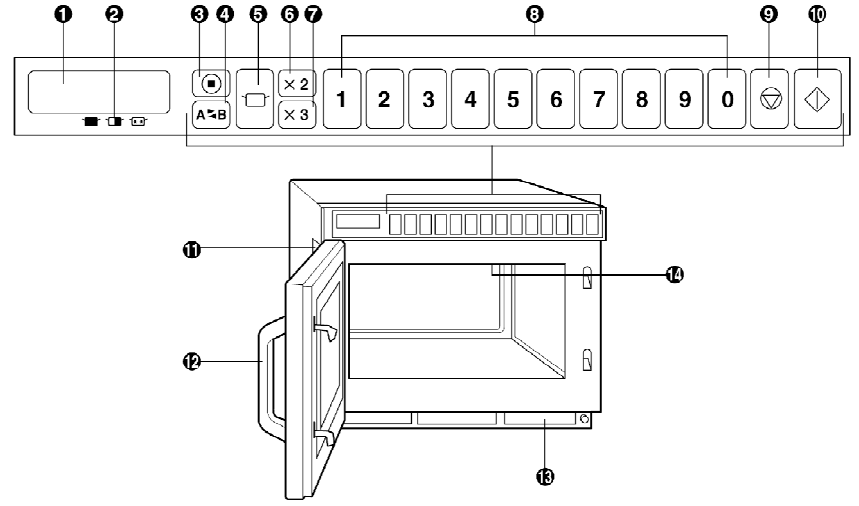


❶ Digital Display Window(see below)
❷ Power Level Indicator Display
❸ Power Level Selector Buttons
❹ Time Dial
❺ Start Button(◈)
❻ Door Handle
❼ Oven Lamp Cover
❽ Air Filter
❾ Splatter Shield(top of inner cavity)

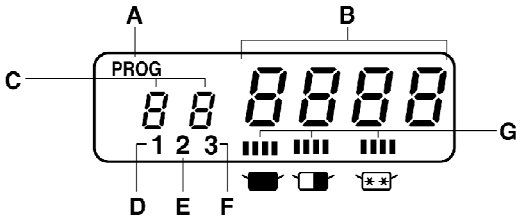
A—Heating Time Display(min.,sec.)
B—Power Level Indicator
HIGH
MEDIUM
DEFROST

NE-2156/NE1656

Outline Diagram



❶ Digital Display Window(see below)
❷ Power Level Indicator Display
❸ Program Pad (⊙)
❹ Shift Pad
❺ Power Level Selector Pad ( )
❻ Double Quantity Pad
❼ Treble Quantity Pad
❽ Number/Memory Pads
❾ Stop/Reset Pad (▽)
❿ Start Pad (◇)
⓫ Oven Lamp Cover
⓬ Door Handle
⓭ Air Filter
⓮ Splatter Shield(top of inner cavity)



A–Program Display
B–Heating Time Display (min. sec.)
C–Memory Pad Number Display
D–1st Stage Heating Indicater
E–2nd Stage Heating Indicator
F–3rd Stage Heating Indicator
G–Power Level Indicator
HIGH
MEDIUM
DEFROST

2. OPERATION PROCEDURE (NE-2156/NE-1656)

1. Manual heating for single stage

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load in the oven and close the door.	0
3. Tap POWER LEVEL pad ( ) once. (Set to High power)	1
4. Set the desired heating time by tapping number pads 2, 0, 0. (Set to 2 minutes)	1 2:00
5. Tap START pad ( ).	1 1:59
6. When the time is up, you hear 3 beeps sound.	0
7. Open the door and take out the water load. The display goes back to previously setting time.	1 2:00
8. Close the door. 1 minute later, display will return blank.	

2. Manual heating for 2nd or 3rd stage

OPERATION	DISPLAY
1. Follow step 1 to 4 for single stage.	1 2:00
2. Tap POWER LEVEL pad ( ) twice. (Set to MED power)	1 2
3. Set the desired heating time by tapping number pads 1, 0, 0. (Set to 1 minute)	1 2 1:00
4. Tap START pad ( ). (1st stage)	1 2 2:59
5. When the 1st stage time is up, you hear 1 beep sound. (2nd stage)	2 :59
6. When the time is up, you hear 3 beeps sound.	0
7. Open the door and take out the water load. The display goes back to previously setting time.	1 2 3:00
8. Close the door. 1 minute later, display will return blank.	

NOTE: For a 3rd stage heating cycle, select a further power level and time between steps 3 and 4 above.

3. Memory setting for single stage

OPERATION	DISPLAY
1. Display must be blank before programming can begin. Touch ⏹ pad.	PROG
2. Tap 5 pad. (Set to memory pad 5) NOTE: Previously selected power and time will appear.	PROG A 5 1 100
3. Tap POWER LEVEL pad ( ) once. (Set to High power)	PROG A 5 1
4. Set the desired heating time by tapping number pads 1, 0, 0. (Set to 1 minute)	PROG A 5 1 100
5. Touch ⏹ pad again.	PROG A 5 1 100
6. 3 seconds after, the display window will go blank.	

TO PROGRAM MEMORY AREA B: Follow steps 1 above. Touch the Memory Shift pad A►B and a small "B" will appear beneath the flashing "PROG".
Touch the memory pad you wish to program, and the previously selected time and power level will appear in the display window.

NOTE: Once the Memory area B has been selected it cannot be changed back to Memory area A. If you do not require Memory area B, cancel it by touching the cancel pad and begin again.

4. Memory setting for 2nd or 3rd stage

OPERATION	DISPLAY
1. Follow steps 1 to 4 for memory setting for single stage.	PROG A 5 1 100
2. Tap POWER LEVEL pad ( ) twice. (Set to MED power)	PROG A 5 1 2
3. Set the desired heating time by tapping number pads 2, 0, 0. (Set to 2 minutes)	PROG A 5 1 2 200
4. Touch Program pad again. Heating time is displayed by adding single and 2nd stage heating time.	PROG A 5 1 2 300
5. 3 seconds after, the display window will become blank.	

NOTE: For a 3rd stage heating cycle, select a further power level and dial in a time, between steps 3 and 4 above.

5. Memory pad heating

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load in the oven and close the door.	0
3. Tap 5 pad.	PROG A 5 1 2 300
4. Tap START pad ( ). (1st stage)	PROG A 5 1 2 259
5. (2nd stage)	PROG A 5 2 159
6. When the time is up, you hear 3 beeps sounds.	0
7. Open the door and take out the water load.	0
8. Close the door. Display will return blank after 1 minute.	

NOTE: When program is locked, heating can be started automatically by tapping memory pad.

6. Programming Double or Treble Quantity Pad

OPERATION	DISPLAY
1.The display window must be blank before programming can begin.	
2.Press the ⏹ pad.	PROG
3.Press 0 pad. The pad number and previously selected time and power will appear.	PROG A 0 2 00
4.Press X2 pad. The previously programmed magnification number appear. ex. 15 means 1.6 times. ※**NOTE: When you want program for treble quantity heating, press X3 pad.**	PROG A 0 2 16
5.Set the desired magnification by pressing the appropriate number pad. ex. 1.5 times: press 1 and 5	PROG A 0 2 15
6.Press the ⏹ pad again.	PROG A 0 2 15
7.After 3 seconds the display will goes blank.	

7. Memory Pad Heating for Double or Treble Quantity Heating

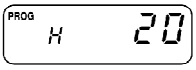
OPERATION	DISPLAY
1.Open the door place a water load in the oven and close the door.	0
2.Press the X2 pad. **NOTE: When you want treble quantity heating, press X3 pad.**	PROG 2
3.Press the desired memory pad. ex. memory 0 (programme No. A-0)	PROG A 0 3 00 1
4.Press ◇ pad.	PROG A 0 2 59
5.When the time is up, you will hear 3 beeps sound.	0
6.Open the door and remove the water load.	0
7.Close the door 1 minute later, display will return blank.	

8. Procedure to Program the Air Filter

OPERATION	DISPLAY
1. Open the door and leave it open.	0
2. While pressing ◇ pad, close and open the door.	0
3. Quickly press 3 pad. The display will show the length of time originally PRESET. ex: 100 hours	PROG H 100
4. Set the desired clean time by pressing appropriate pads. ex: 1230 hours, press 1 2 3 0 pads.	PROG H 12 30
5. Press ■ pad.	PROG H 12 30
6. After 3 seconds, "0" will appear.	0
7. After the programmed time past, at the end of cooking, "FILT" will appear.	FILT

NOTE: To check the total number of hours used.
1. Open the door and leave it open.
2. Whilst pressing the ◇ press the "3" pad.
3. The display will show the number of hours used. "PROG"and "H" will appear in the display.

[Example]: If the oven has been used for 20 hours.



After 3 seconds "0"will appear in the display window.

9. To Read the Cycle Counter

OPERATION	DISPLAY
1.Open the door and leave it open.	0
2. While pressing ▽ pad, press each memory pad. The display shows the number of times each memory pad has been used. Within 3 seconds, pressing the ☐ pad to show the number of times the oven has been used in the manual mode. ex: 6666→6,666 times. **NOTE: To read the number of times the oven has been used in the B side programmes. Press A-B shift pad. Then while pressing the ▽ pad press each memory pad.**	6666
3. Remove your finger from ▽ pad and quickly close door while the display is still showing a pad's cycle count. Display will now show the total cumulative number of times the oven has been used. ex: 99999→99,999 times.	9 9999
4. 3 seconds later, the display will go blank.	

NOTE: Total cumulative number includes programming memory heating and manual heating number of times has been used. Cooking times over 99,999 times will be back 0.

10. To Activate Program Lock

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle. Do not open the door.	
2. Press and hold ■ pad until the display show "PROG", "P" and "L". (for more than 5 seconds)	PROG
3. Program lock feature now activated.	PROG P L

11. To Release Program Lock

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Leave it open. While pressing ▽ pad, press and hold ■ pad untill the display will show "PROG" and "P". (for more than 5 seconds)	0
3. Program lock feature is now deactivated.	PROG P

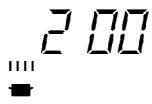
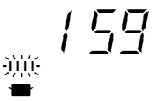
12. To Select Beep Tone Options

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door and leave it open.	0
3. Press ■ pad and then within 1 minute press 0 pad.	PROG 1 3 bE EP
4. Select the desired sound loudness level by pressing 0 pad. Repeated pressing of 0 pad will lower the loudness and all the way to silent.	PROG 1 2 bE EP
5. Press ■ pad again.	PROG 1 2 bE EP
6. Close the door. 1 minute later display window will go blank.	

To select length of tone at end of heating cycle there are 2 options.
A. 3 beeps (factory setting)
B. 60 seconds of short beeps.
To set for 60 seconds of short beeps.

OPERATION	DISPLAY
1. Complete steps 1-4 above. Do not close the door.	PROG 1 3 bE EP
2. Touch ■ pad and quickly select the desired tone length by touching 0 pad. "1" illuminated 3 beeps. "2" illuminated 60 seconds of beeps.	PROG 2 3 bE EP
3. Press ■ pad again. 3 seconds later, the display will " 0 ".	PROG 2 3 bE EP
4. Close the door 1 minute later display will go blank.	

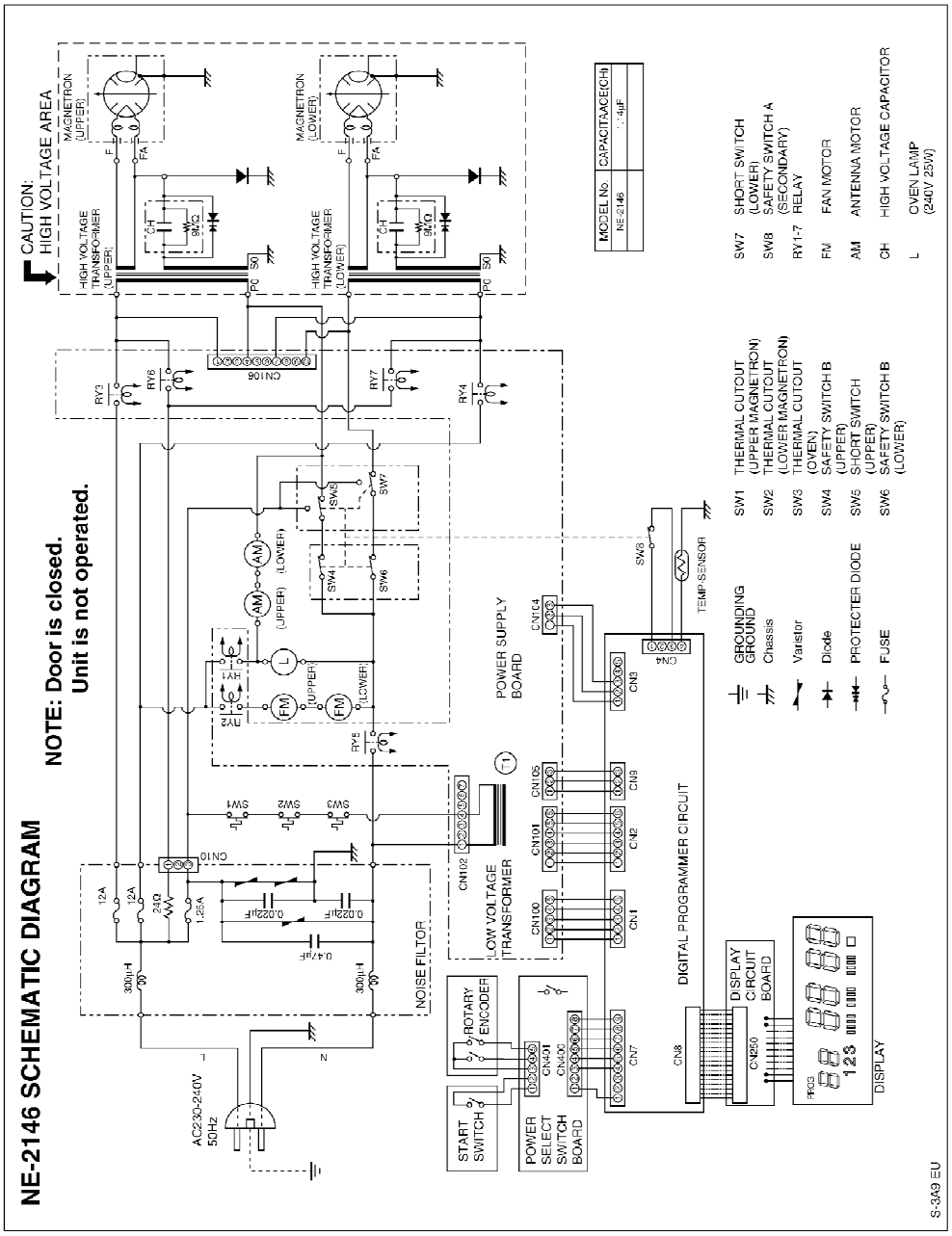
3. OPERATION PROCEDURE (NE-2146)

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load and close door.	
3. Select desired power level if other than ▬ (HIGH) power.	
4. Set the desired heating time by turning the timer dial. NOTE: (HIGH····· MAX 25 MIN MED, DEF··· MAX 30 MIN)	
5. Press the start button.	
6. When the time is up, display will blink "0" until door is opened.	
7. Open the door and remove water load.	
8. Close the door. 1 minute later, display will go blank.	

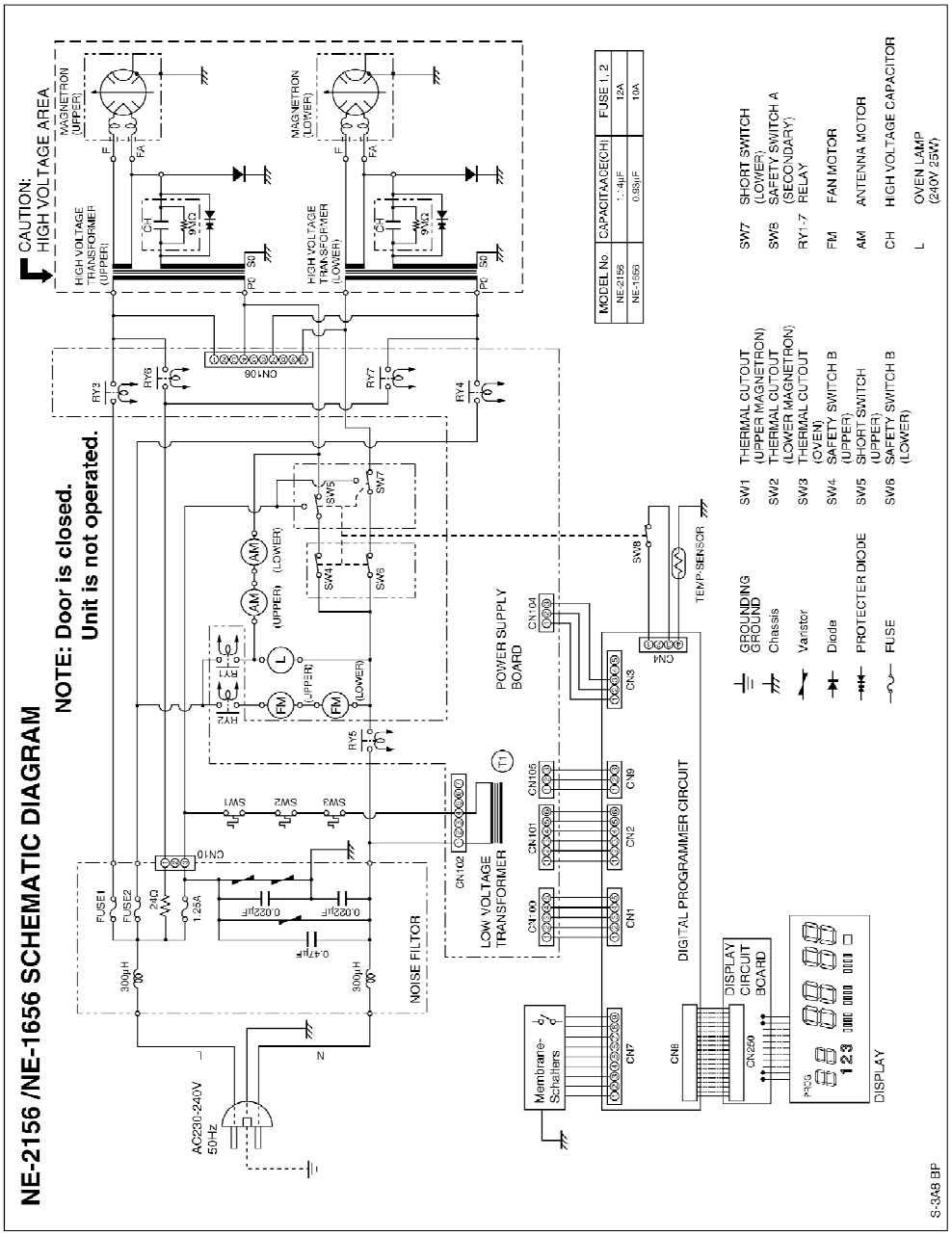
Notes:

1. When you press the Start Button with door open, "0" will appear in the display in all cases.
2. Even after setting the heating time you can still change the power level.
3. If you wish to change the heating time during heating, simply adjust the timer to desired minutes and seconds.

4. SCHEMATIC DIAGRAM NE-2146

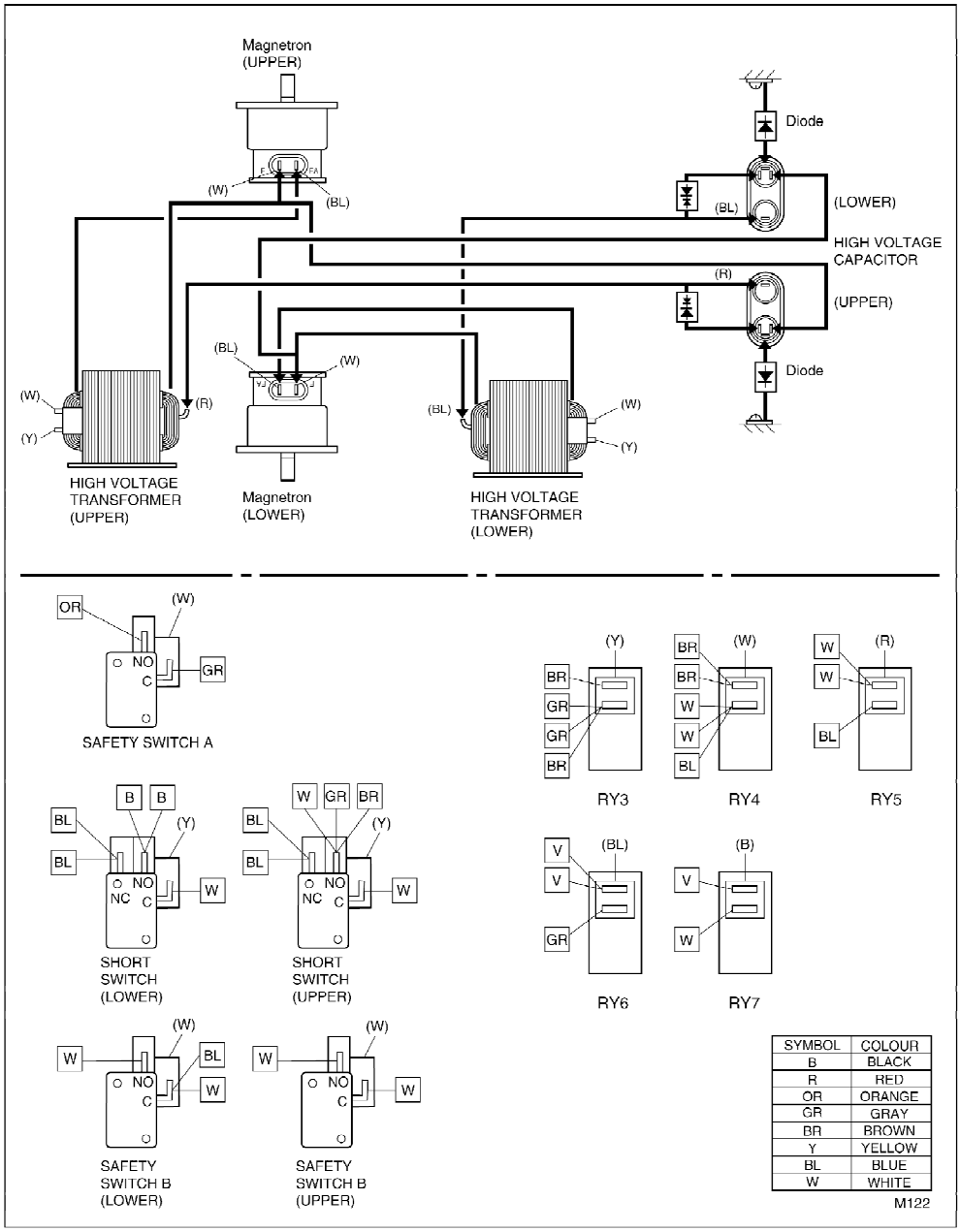


5. SCHEMATIC DIAGRAM NE-2156/NE-1656



6. WIRING DIAGRAM

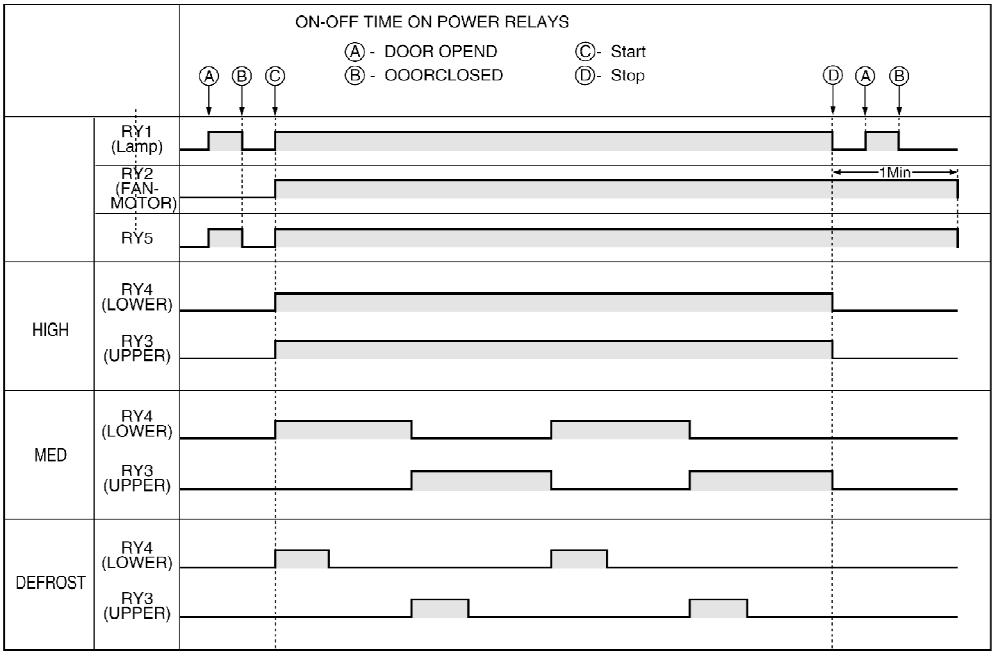
NOTE: When replacing, check the lead wire colour as shown.



7. DESCRIPTION OF OPERATING SEQUENCE

Variable power cooking control

The coil of power relay A and B are energized intermittently by the digital programmer circuit, when the oven is set to MEDIUM or DEFROST power position. The digital programmer circuit controls the ON-OFF time of the power relay A and B contacts in order to vary the output power of the microwave oven. One complete ON and OFF cycle of the power relay is 44 seconds. The relation between indications on the control panel and the output power of the microwave oven is as shown in Figure.



96-002M

8. CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high voltage, high current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION
Servicemen should remove their watches whenever working close to or replacing the magnetron.

8.1. Check the earthing

Do not operate on a 2 wire extension cord. The microwave oven is designed to be used in a completely earthed condition. It is imperative, therefore, to make sure it is properly earthed before beginning repair work.

8.2. If the door lock, the door switch, the door seal or the door develops a malfunction, be sure not to operate the oven until complete repairs are made.

If the oven is operated with any of these parts in imperfect condition, hazardous microwave leakage might occur.

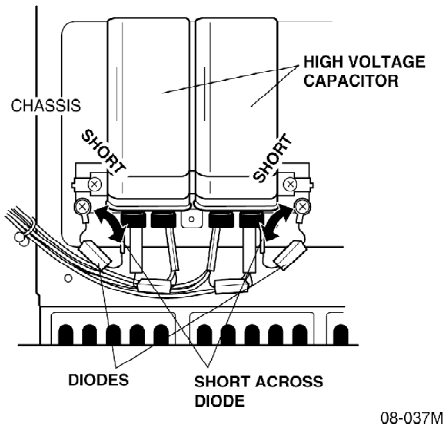
WARNING

Never operate the oven until the following are confirmed:

1. The door is tightly closed.
2. There is no broken hinge or door arm.
3. The door seal is not damaged.
4. The door is not bent or warped.
5. There is no other visible damage.

8.3. Warning about the electric charge in the high voltage capacitor.

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitor. When replacing or checking parts, remove the power plug from the outlet, wait 30 seconds and short the terminal of the high voltage capacitor (terminal of lead wire from diode) to chassis ground with an insulated jumper lead wire or an insulated handle screwdriver to discharge.



Discharge the 2 High Voltage Capacitors.
Touch chassis side first then short to the high voltage capacitor terminal

Important Note

1. High voltage above 250 volts are existing on following parts during operation.

-Magnetron
-High Voltage Transformer
-High Voltage Diode
-High Voltage Capacitor

Unusual attention should be paid during repair or troubleshooting of product.

2. If the microwave oven is operated with incorrect installed door hinge or magnetron, it can cause microwave leakage of over 5mW/sequar centimeter. Hence it is absolutely necessary to check if magnetron and door hinge are correctly and safely installed after repairs or replacement.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

8.4. When parts must be replaced, always remove the power plug from the outlet, and discharge the high voltage capacitor.

8.5. Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwave might leak if screws are not properly tightened.
2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.

8.6. Avoid inserting nails, wire, etc. through holes in unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.

8.7.

CAUTION MICROWAVE RADIATION
Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating device if it is improperly used or connected all input and output microwave connections waveguides, flanges, and gasket must be secure. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

8.8.

CAUTION
High voltage parts may become uncovered when outer cabinet is removed.

9. DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

CAUTION
Servicemen should remove their watches whenever working close to or replacing the magnetron.

9.1. Replacement of magnetrons (Upper and Lower)

Upper magnetron

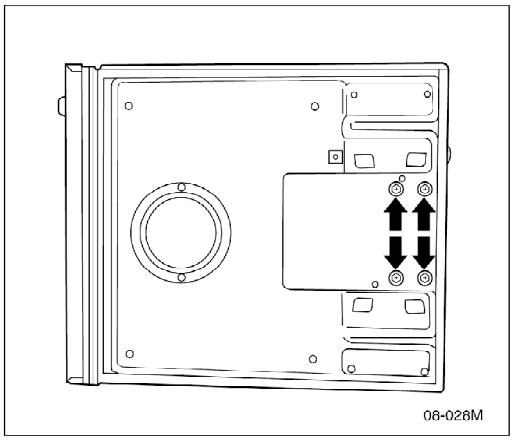
1. **Discharge electric charge remaining on the high voltage capacitors.**
2. **Remove the entire rear panel by removing screws as shown.**
3. **Disconnect all lead wires from magnetron and thermal cutout.**
4. **Remove the 4 screws holding magnetron.**
5. **Remove 2 screws holding thermal cutout.**
6. **Remove the mounting bracket from magnetron and install it on the new magnetron.**

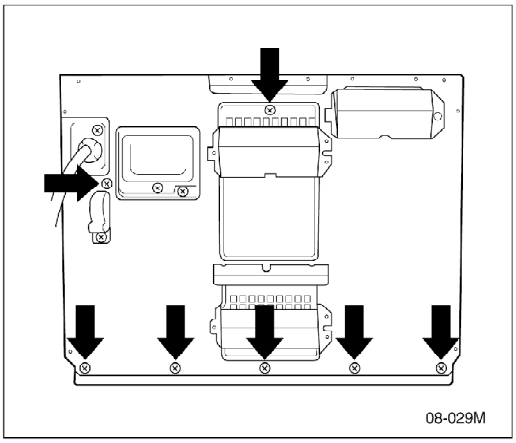
Lower magnetron

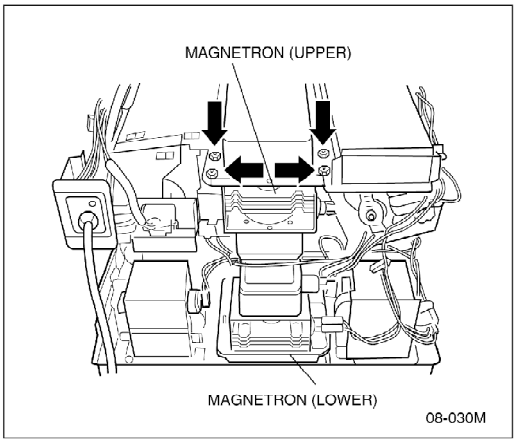
1. **Discharge electric charge remaining on the high voltage capacitors.**
2. **Remove the entire rear panel by removing screws as shown.**
3. **Carefully place the unit on its left side (H.V.Capacitor side).**
4. **Remove the cover by removing 2 screws.**
5. **Remove the 4 screws holding magnetron by inserting screwdriver through the 4 openings on bottom plate.**
6. **Remove 2 screws holding thermal cutout.**
7. **Remove the mounting bracket from magnetron and install it on the new magnetron.**

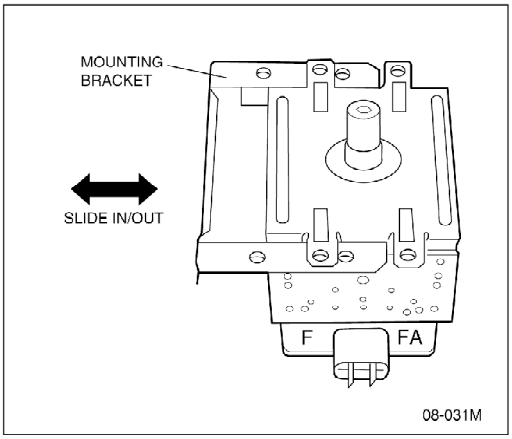
NOTE:
To prevent microwave leakage, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron.

CAUTION
When connecting 2 filament lead wires to the magnetron terminals, be sure to connect the lead wires in the correct position. The lead wire with blue connector should be connected to “FA terminal” and white or pink one should be connected to “F terminal”.


08-028M


08-029M


MAGNETRON (UPPER)
MAGNETRON (LOWER)
08-030M



Removal of Positive Lock connector

The positive lock connector is a specially designed loose free connector and you will find this connector in many lead wire connections. To remove this connector, pull the lead wire by pressing an extruded lever in the center of receptacle terminal as shown.

9.2. Replacement of power supply circuit board

NOTE:

Be sure to ground any static electric charge built up on your body, before handling the power supply P.C.B. and D.P.C..

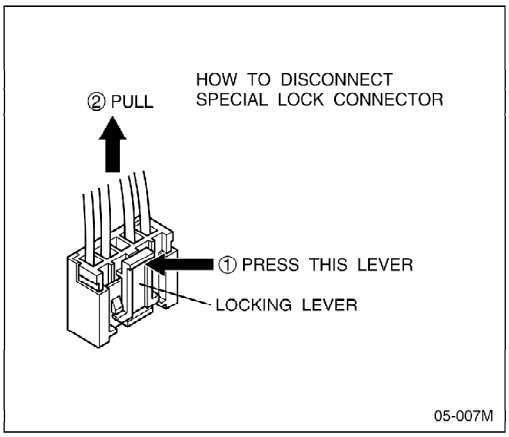
1. **Disconnect all lead wires from power supply circuit board.**
2. **Remove the power supply P.C.B. together with its mounting bracket by first removing the 2 bracket holding screws.**
3. **The power supply P.C.B. can be separated from mounting bracket by removing the 2 L.V.T. holding screws and unfastening the plastic clips.**

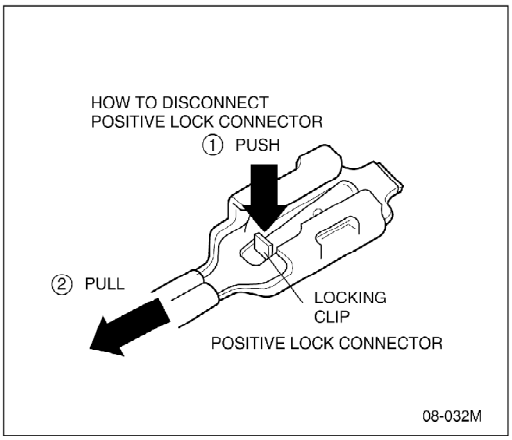
9.3. Replacement of digital programmer circuit board

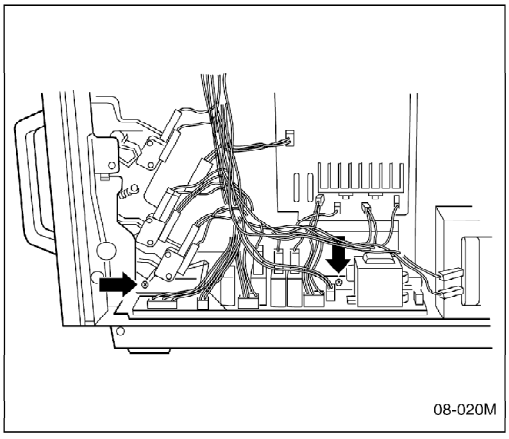
1. **Remove grounding screw for membrane switch and D.P.C. ground.**
2. **Remove 3 screws holding control panel assembly to detach it from main unit then remove connectors.**
3. **Remove 2 screws holding the D.P.C. board and while pushing back on 2 plastic holding clips, remove the board.**

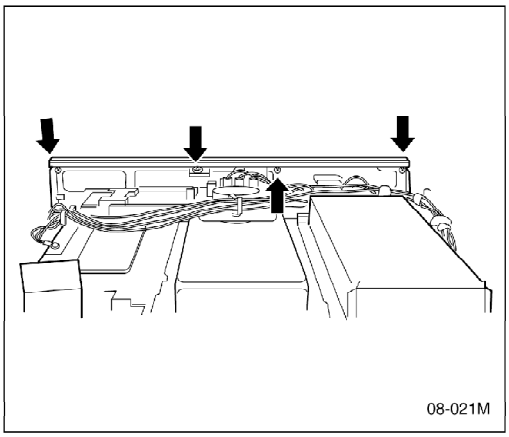
NOTE:

Please use care in handling the power supply P.C.B. and D.P.C. board to avoid damage.


HOW TO DISCONNECT
SPECIAL LOCK CONNECTOR
② PULL
① PRESS THIS LEVER
LOCKING LEVER
05-007M


HOW TO DISCONNECT
POSITIVE LOCK CONNECTOR
① PUSH
② PULL
LOCKING
CLIP
POSITIVE LOCK CONNECTOR
08-032M


08-020M



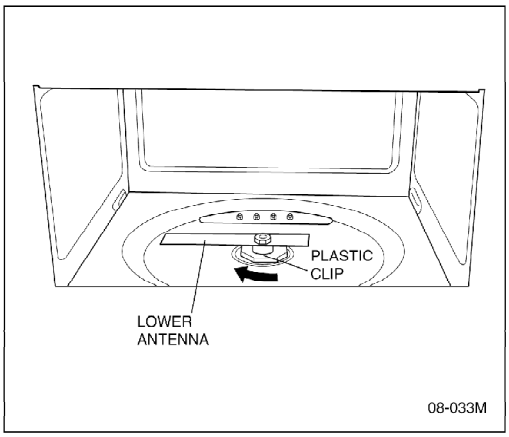
9.4. Replacement of upper antenna

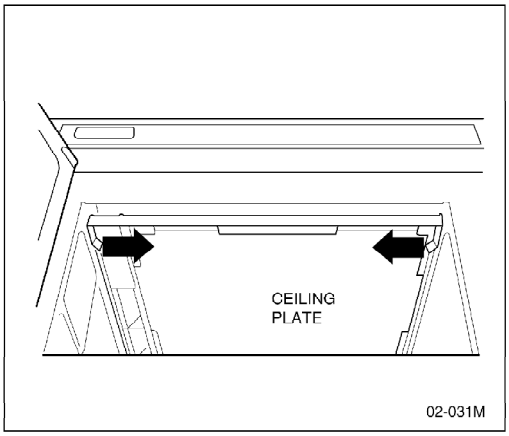
CAUTION
The upper and lower rotating antennas are different type and are not interchangeable each other. Care should be taken not to reverse the top and bottom antennas.

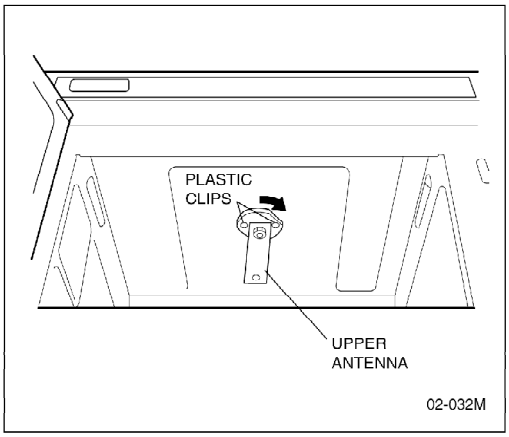
1. **Remove ceiling plate by gently moving the left and right tabs inward while pulling the plate down and outward.**
2. **Using a small flat screwdriver or the like, remove two plastic clips located on the antenna ring. Next turn the antenna ring approx. 1/ 8 turn clockwise to unhook the tabs and pull off.**

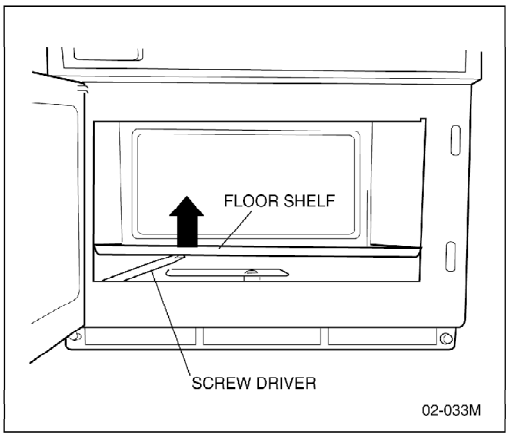
9.5. Replacement of floor shelf and lower antenna

1. **To remove the floor shelf, insert a screwdriver through the small opening on the left side of the oven cavity and carefully lift the floor shelf.**
2. **For removal of lower antenna, use the same procedure as upper antenna.**


PLASTIC
CLIP
LOWER
ANTENNA
08-033M


CEILING
PLATE
02-031M


PLASTIC
CLIPS
UPPER
ANTENNA
02-032M



9.6. Replacement of temperature sensor (Thermal protector)

1. Cut 2 lead wires at the top of sensor terminals.
2. Remove 2 screws holding temp sensor and replace with new one.
3. Solder the lead wires securely to the sensor terminals.

9.7. Disassembly of door assembly

1. Remove each 2 bolts holding upper and lower hinges.
2. Open the door and while pulling the door outward, work upper and lower hinges out through the holes of the front surface of oven.
3. Remove door C (choke cover) from door E by carefully pulling outward starting from the upper right hand corner.
4. Remove 2 screws holding door handle and separate door A from door E by carefully freeing catch hooks.
5. Remove door key, door key lever, door key spring and handle pins from door E.
6. Assemble the door by taking the above steps in a reverse order.

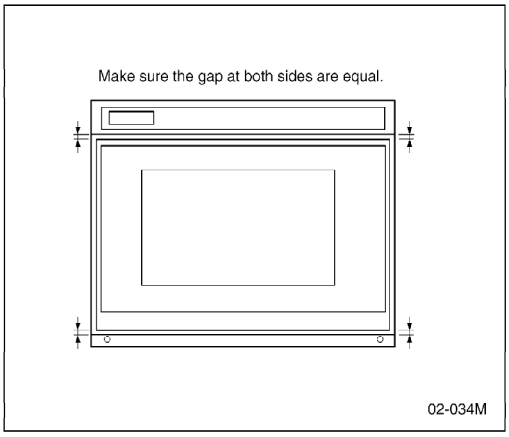
Replacement

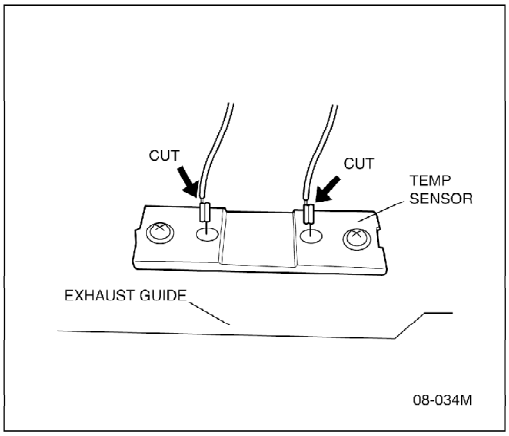
1. When mounting the door to the oven be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
2. Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not

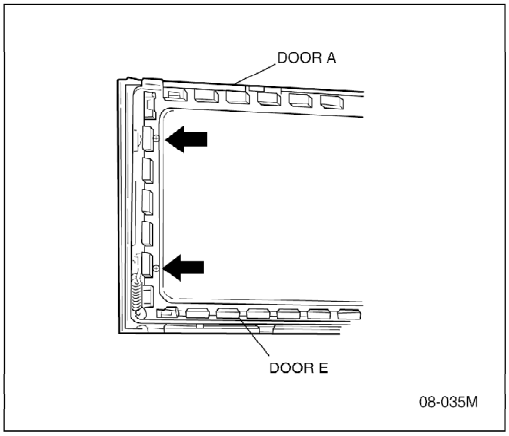
mounted properly, microwave may leak from the clearance between the door and the oven.

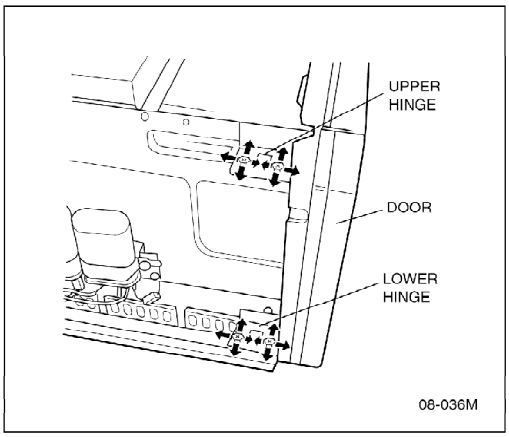
NOTE:

Please refer to MEASURENMENT AND ADJUSTMENT.









10. COMPONENT TEST PROCEDURE

CAUTION

1. High voltage is present at the high voltage terminal of the high voltage transformer during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

10.1. High voltage transformer

1. **Remove connections from the transformer terminals and check continuity.**
2. **Normal (cold) resistance readings should be as follows:**
   Secondary winding Approx. 80 Ω — 120 Ω
   Filament winding Approx. 0 Ω
   Primary winding Approx. 0 Ω — 3 Ω

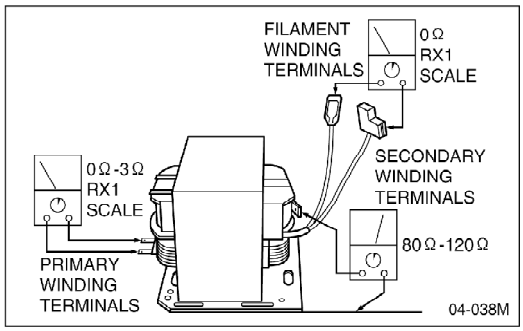
10.2. High voltage capacitor

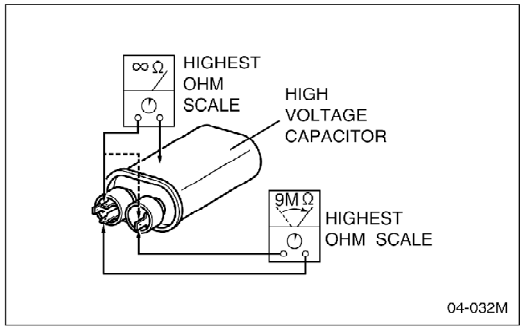
1. **Check continuity of capacitor with meter on highest OHM scale.**
2. **A normal capacitor will show continuity for a short time, and then indicate 9M Ω once the capacitor is charged.**
3. **A shorted capacitor will show continuous continuity.**
4. **An open capacitor will show constant 9M Ω .**
5. **Resistance between each terminal and chassis should be infinite.**

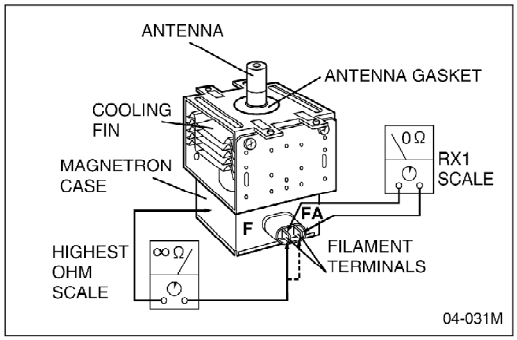
10.3. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

1. **Isolate magnetron from the circuit by disconnecting the leads.**
2. **A continuity check across magnetron filament terminals should indicate one ohm or less.**
3. **A continuity check between each filament terminal and magnetron case should read open.**







10.4. Diode

1. **Isolate the diode from the circuit by disconnecting the leads.**
2. **With the ohmmeter set on the highest resistance scale, measure the resistance across the diode terminals. Reverse the meter leads and again observe the resistance reading. Meter with 6V, 9V or higher voltage batteries should be used to check the front-to-back resistance of the diode, otherwise an infinite resistance may**

be read in both directions. A normal diode's resistance will be infinite in one direction and several hundred k Ω in the other direction.

10.5. Membrane key board (Membrane switch assembly)

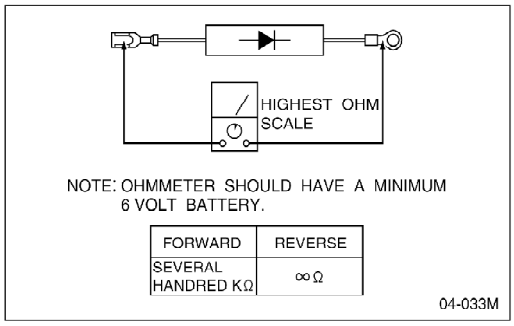
Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

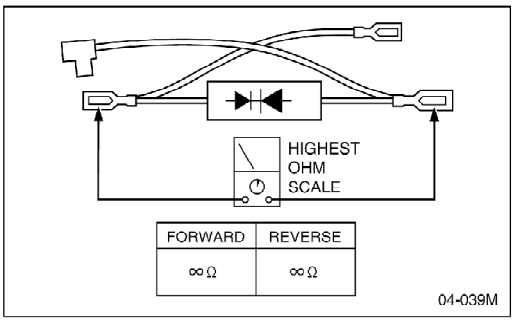
10.6. Protector diode

1. **Isolate the protector diode assembly from the circuit by disconnecting its leads.**
2. **With the ohmmeter set on the highest resistance scale, measure the resistance across the protector diode terminals. Reverse the meter leads and again observe the resistance reading. A normal protector diode's resistance will be infinite in both directions. It is faulty if it shows continuity in one or both directions.**

10.7. Temp sensor (Thermal protector)

A temp sensor is mounted on exhaust guide. Its purpose is to automatically shut off the oven in case the cavity overheats for any reason.
The thermal protector will operate at 257°F (125°C).
The device is connected to the DPC on touch control models.
When the thermal protector exceeds its temperature it will turn off the power to oven cavity and display will go to reset mode.
The cooking program can be reset after cool-down.
THERMISTOR RESISTANCE VALUE
30K—120K at 10°C-30°C (50°F — 86°F)





11. MEASUREMENTS AND ADJUSTMENTS

11.1. Adjustment of Safety switch A, Safety switch B and short switch

1. **When mounting Safety switch A, Safety switch B and short switch to door hook assembly, mount the Safety switch A, Safety switch B and the short switch to the door hook assembly as shown in table.**

NOTE:
No specific adjustment during installation of Safety switch A, Safety switch B and short switch to the door hook is necessary.

2. **When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.**
3. **Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.**

11.2. Measurement of microwave output

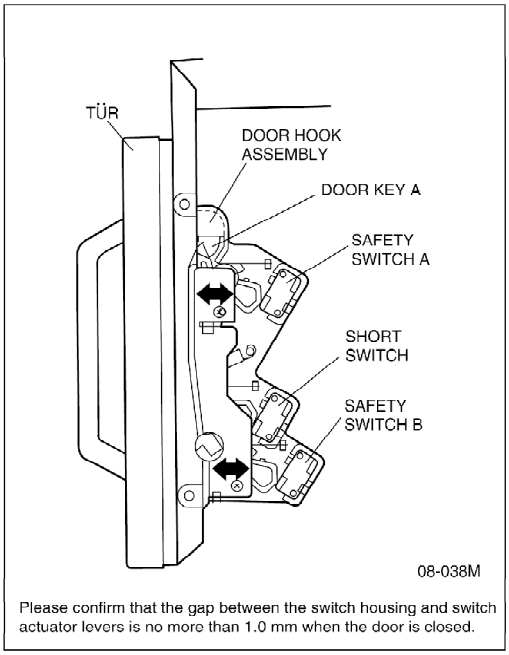
The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.
Necessary Equipment:

- **1 liter beaker**
- **Glass thermometer**
- **Wrist watch or stopwatch**

NOTE:

Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. **Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker's temperature. (recorded as T1)**
2. **Place the beaker on the center of glass cook plate. Set the oven for High power and heat it for exactly one minute.**
3. **Stir the water again and read the temperature of the beaker. (recorded as T2)**
4. **The normal temperature rise (T2-T1) at High power position for each model is as shown in table.**



Please confirm that the gap between the switch housing and switch actuator levers is no more than 1.0 mm when the door is closed.

TABLE (1 liter-1 min. test)

RATED OUTPUT	TEMPERATURE RISE
2100 W (IEC-705)	Min. 18°C
1600W (IEC-705)	Min. 14.5°C

12. TROUBLESHOOTING GUIDE

CAUTION

1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge high voltage capacitor.
4. When checking the continuity of the switches or the high voltage transformer, disconnect one lead wire from these parts and then checl with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect lead wire may be open or the connector cannot be removed.
5. Be sure to ground any static electric charge built up in your body, before handling the D.P.C.
6. A 230-240V AC is present at the shaded area ( ) of the power supply circuit board (Terminals of power relays and primary circuit of low v transformer). When troubleshooting, be cautious of possible electrical shock hazard.

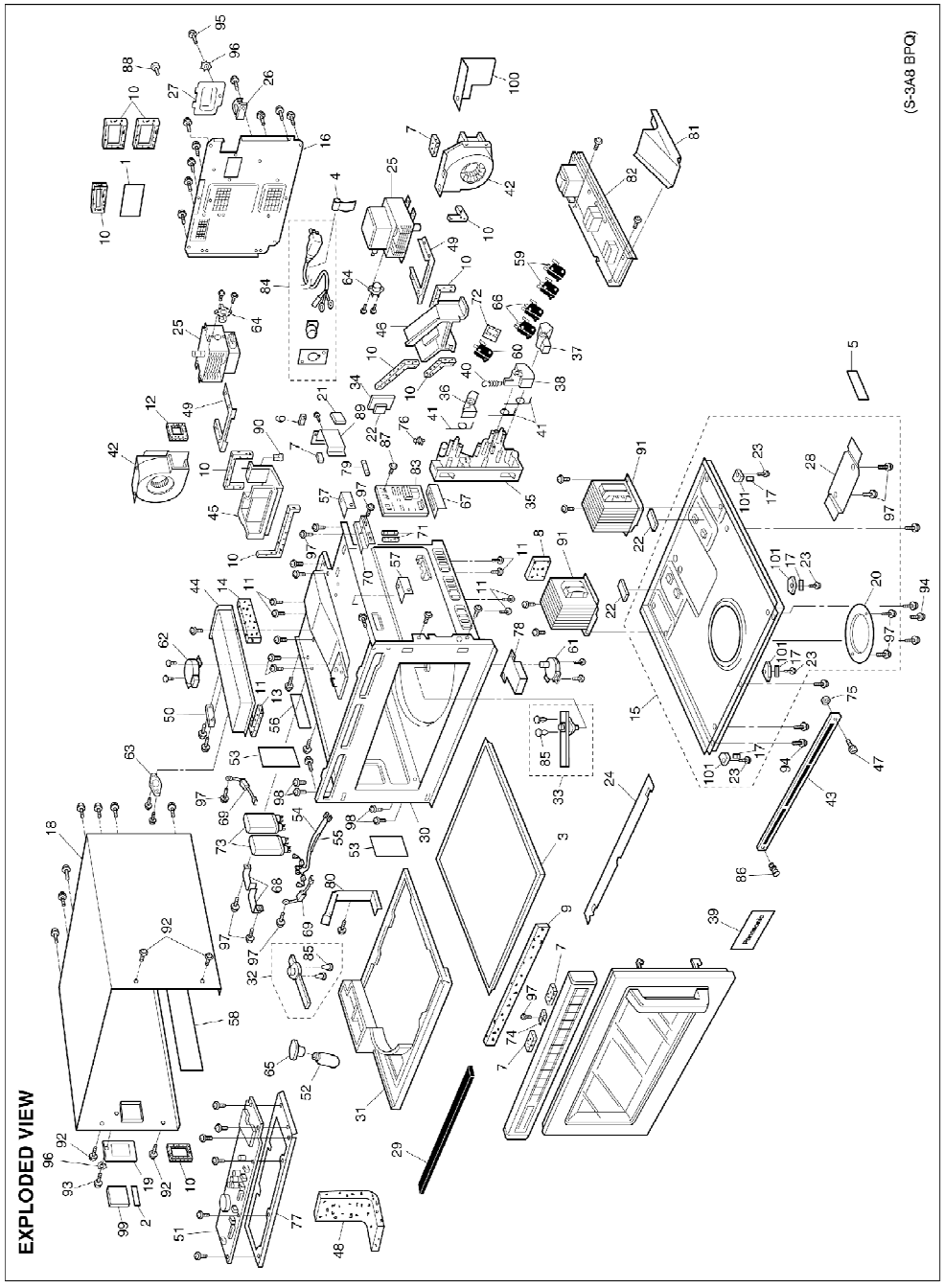
First of all operate the microwave oven following the correct operating procedures described on pages 3 of this service manual in order to find the exact cause of any trouble.

NOTE:
If the unit shows faulty symptom as shown below, check the parts listed in possible cause column depending on failure indication e.g. F81, F82 in the display.

[TROUBLE 1] Oven does not operate at all or oven does not start cooking.

DISPLAY	CONDITIONS	POSSIBLE CAUSE	TIMING OF FAILURE IN
F33	Open temperature sensor (exhaust)	1. Temperature sensor failure 2. Digital programmer circuit failure 3. Loose connector CN4	It is appeared when fail occured.
F34	Short temperature sensor (exhaust)	1. Temperature sensor failure 2. Digital programmer circuit failure	It is appeared when fail occured.
F44		1. Shorted power select switch 2. Shorted membrane switch	It is appeared 2 minutec failure occured.
F01 / (With continuous beep sounds)	Exhaust temperature exceeds 120°C	1. Burning food in the oven due to over cook	It is appeared when exh temperature exceeds ab 120°C.
F05	Memory failure	1. Digital programmer circuit failure	
No display	1.25A fuse blown	1. Switch failure SW4, SW5, SW6, SW7 2. Low-Voltage transformer failure	
No display	1.25A fuse is OK	1. Switch failure SW1, SW2, SW3 2. Low voltage transformer failure 3. Digital programmer circuit failure	
F81	No voltage supply to high voltage transformer (upper)	1. Relay failure RY-3 2. 10A fuse open 3. Digital programmer circuit failure	It is appeared when coc completed.
F82	No voltage supply to high voltage transformer (lower)	1. Relay failure RY-4 2. 10A fuse open 3. Digital programmer circuit failure	It is appeared when coc completed.
F86	Shorted contacts of RY-3	1. Relay failure RY-3 2. Digital programmer circuit failure	It is appeared when fail occured.
F87	Shorted contacts of RY-4	1. Relay failure RY-4 2. Digital programmer circuit failure	It is appeared when fail occured.

13. EXPLODED VIEW AND PARTS LIST



14. PARTS LIST

NOTE

When ordering replacement part(s), please use part number(s) shown in this parts list. / Do not use description of the part. / Important safety notice: / Components identified by ⚠ mark have special characteristics important for safety. / When replacing any of these components, use only manufacturer 's specified parts.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
1	A00064080BP	CAUTION LABEL	1	FOR BPQ
1	ANE00062Q0EP	CAUTION LABEL	1	FOR EUG
2	ANE0072Z70GP	CAUTION LABEL	1	
3	ANE010T8U0AP	SHELF	1	
4	A02393A80BP	CORD LABEL	1	FOR BPQ
5	A05243A80BP	NAME LABEL	1	NE-2156BPQ
5	A05243A90BP	NAME LABEL	1	NE-2146BPQ
5	A05243A80EU	NAME LABEL	1	NE-2156EUG
5	A05243A90EU	NAME LABEL	1	NE-2146EUG
5	A05243A30EU	NAME LABEL	1	NE-1656EUG
6	ANE0901000CD	CUSHION RUBBER A	1	
7	ANE000Z000AD	CUSHION RUBBER A	4	NE-2156,NE-1656
7	ANE000Z000AD	CUSHION RUBBER A	3	NE-2146
7	ANE000Z000AD	CUSHION RUBBER A	4	NE-2156,NE-1656
7	ANE000Z000AD	CUSHION RUBBER A	4	NE-2156,NE-1656
8	ANE0911000MG	CUSHION RUBBER B	1	
9	A8251-3180	SPACER	1	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
10	ANE000Z000AA	CUSHION RUBBER C	10	
11	XYEANE5+C16T	SCREW	8	5X16(FOR MAGNETRON)
11	XYEANE5+C16T	SCREW	8	5X16(FOR MAGNETRON)
11	XYEANE5+C16T	SCREW	8	5X16(FOR MAGNETRON)
11	XYEANE5+C16T	SCREW	8	5X16(FOR MAGNETRON)
12	ANE000Z000AB	CUSHION RUBBER C	1	
13	ANE0962000AP	CUSHION RUBBER D	1	
14	ANE0962000AV	CUSHION RUBBER D	1	
15	A100A-3280	BASE	1	W/OUT FOOT & RUBBER FOOT (NOTE)
16	A100Q-3280	BACK PANEL	1	
17	A1008-3280	RUBBER FOOT	4	
17	A1008-3280	RUBBER FOOT	4	
17	A1008-3280	RUBBER FOOT	4	
17	A1008-3280	RUBBER FOOT	4	
18	ANE10098U0AP	CABINET BODY	1	
19	ANE10268U0AP	LAMP COVER	1	
20	ANE10288U0AP	ANTENNA MOTOR COVER	1	
21	ANE10498U0AP	CUSHION RUBBER	1	
22	ANE1062-8U0	CUSHION RUBBER B	3	
22	ANE1062-8U0	CUSHION RUBBER B	3	
22	ANE1062-8U0	CUSHION RUBBER B	3	
23	XTWANE3+8EX	SCREW	4	3X8(FOR FOOT)
23	XTWANE3+8EX	SCREW	4	3X8(FOR FOOT)
23	XTWANE3+8EX	SCREW	4	3X8(FOR FOOT)
23	XTWANE3+8EX	SCREW	4	3X8(FOR FOOT)
24	ANE11268U0AP	BASE BRACKET	1	

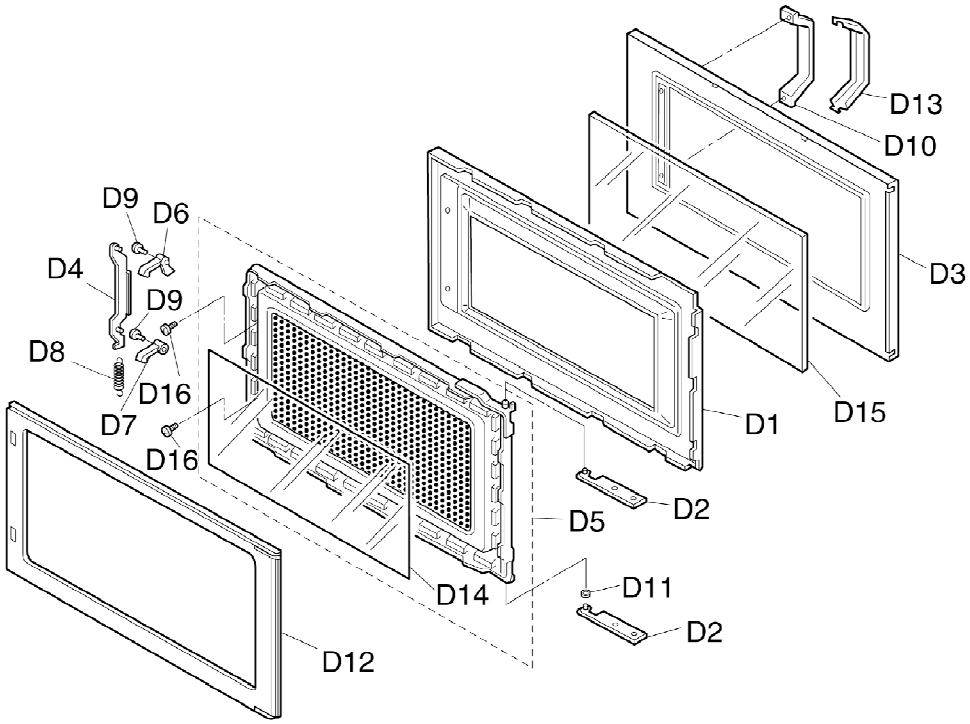
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
25	2M244-M1G	MAGNETRON	2	⚠NE-2156 NE-2146
25	2M210-M1G	MAGNETRON	2	⚠NE-1656
26	ANE11408A0AG	STOPPER	1	
27	A11543170GP	BACK PANEL COVER	1	
28	ANE11668U0AP	BASE METAL	1	
29	ANE11748U0AP	SPACER	1	
30	A200A-3280	OVEN	1	
31	A2011-3280S	CEILING PLATE	1	
32	A202K-3850	ANTENNA(U)	1	
33	A202R3320GP	ANTENNA B(U)	1	
34	ANE21208U0AP	SPACER	1	
35	A3020-3850	DOOR HOOK	1	
36	A3136-3470	HOOK SPACER A	1	
37	A3137-3850	HOOK SPACER B	1	
38	A3138-3470	HOOK SPACER C	1	
39	A31863A30EU	DOOR PANEL	1	NE-1656
39	A31863A80BP	DOOR PANEL	1	NE-2156
39	A31863A90BP	DOOR PANEL	1	NE-2146
40	ANE32398U0AP	SPRING	1	
41	ANE32628U0AP	SPRING	3	
41	ANE32628U0AP	SPRING	3	
42	A400A3310GP	FAN MOTOR	2	⚠(55W)
42	A400A3310GP	FAN MOTOR	2	⚠(55W)
43	A400B-3280	AIR FILTER FLAME	1	
44	A400K-3180	EXHAUST GUIDE	1	
45	ANE40258U0AP	AIR GUIDE A	1	UPPER
46	ANE40268U0AP	AIR GUIDE B	1	LOWER
47	A4091-3280	SCREW	1	FOR AIR FILTER FRAME
48	ANE41038U0AP	AIR GUIDE CUSHION B	1	
49	ANE50328U0AP	MAGNETRON BRACKET	2	
49	ANE50328U0AP	MAGNETRON BRACKET	2	
50	A601L5150AP	TEMP SENSOR	1	
51	A603L3A30EU	D.P.CIRCUIT(U)	1	⚠NE-1656
51	A603L3A80BP	D.P.CIRCUIT(U)	1	⚠NE-2156
51	A603L3320GP	D.P.CIRCUIT(U)	1	⚠NE-2146
52	ANE6030Q50GN	INCANDESCENT LAMP	1	⚠(240V 25W)
53	ANE60408UAP	OVEN LAMP SHEET	2	
53	ANE60408UAP	OVEN LAMP SHEET	2	
54	A606V-3280	PROTECTOR DIODE	1	CONNECTOR COLOUR:RED
55	A606W-3280	PROTECTOR DIODE B	1	CONNECTOR COLOUR:BLUE
56	ANE60708U0BP	INSULATION SHEET A	1	
57	A6070-3280	INSULATION SHEET A	2	
57	A6070-3280	INSULATION SHEET A	2	
58	A60713310BP	INSULATION SHEET B	1	
59	ANE6142-F60	MICROSWITCH	2	⚠(V-15G-3C26)SECONDARY LATCH SWITCH
60	ANE61424L0AG	MICROSWITCH	1	⚠(V-16G-3C26)PRIMARY LATCH SWITCH
61	A6144-3280	ANTENNA MOTOR	1	⚠LOWER(2.5W)
62	A61446030AP	ANTENNA MOTOR	1	⚠UPPER(2.5W)
63	A61454000AP	THERMAL CUTOUT	1	⚠FOR OVEN
64	A61454210AP	THERMAL CUTOUT	2	⚠FOR MAGNETRON
64	A61454210AP	THERMAL CUTOUT	2	⚠FOR MAGNETRON

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
65	ANE61522Q0BP	SOCKET	1	⚠
66	ANE6161-3X0	MICROSWITCH	2	⚠(V-16G-1C25)SHORT SWITCH
67	A6170-3280	INSULATION SHEET C	1	
68	ANE61888U0AP	CAPACITOR BRACKET	2	
69	A6202-3280	DIODE,SI	2	NE-2156,NE-2146
69	A62024000AP	DIODE,SI	2	NE-1656
70	ANE62298U0AP	MOUNTING BRACKET	1	
71	A62303A80BP	FUSE	2	⚠NE-2156,NE-2146(12A)
71	A62304210BP	FUSE	2	⚠NE-1656(10A)
72	ANE6238X20AP	SPACER	1	
73	A63903A80BP	H.V.CAPACITOR	2	⚠NE-2156,NE-2146(1.14MF,AC2300V)
73	A63903430GP	H.V.CAPACITOR	2	⚠NE-1656(0.93MF,AC2300V)
74	ANE64086Q0AP	WASHER	1	NE-2156,NE-1656
75	A6408-3280	WASHER	1	FOR AIR FILTER FRAME
76	ANE65448U0AP	SPACER A	1	
77	A6585-3280	P.C.B.HOLDER	1	
78	A65943030GP	MOTOR COVER	1	
79	A65953170GP	FUSE	1	⚠(1.25A)
80	ANE66038U0BP	OVEN LAMP BRACKET	1	
81	A6688-3180	COVER	1	
82	A692M3310GP	L.V.TRANSFORMER(U)	1	⚠
83	A692Y3A90BP	NOISE FILTER(U)	1	⚠
84	A910A3A80BP	AC CORD W/OUT PLUG(U)	1	⚠BPQ
84	A910A3310GP	AC CORD W/PLUG (U)	1	⚠EUG
85	ANE900T8V0AP	CLIP	2	FOR ANTENAA(U) ANTENNA B (U)
85	ANE900T8V0AP	CLIP	2	FOR ANTENAA(U) ANTENNA B (U)
86	ANE90828U0AP	CLIP(BLACK)	1	FOR AIR FILTER FRAME
87	XYN40F10BN	SCREW	1	4X10(FOR NOISE FILTER(U))
88	ANE91438U0AP	CLIP(GRAY)	1	FOR BACK PANEL
89	ANE91448U0AP	BRACKET	1	
90	ANE91628U0AP	CLIP B	1	FOR AIR GUIDE A
91	A622A3A80EU	H.V.TRANSFORMER	2	⚠NE-2156 NE-2146
91	A622A3310GP	H.V.TRANSFORMER	2	⚠NE-1656(1.5KVA)
92	XTC4+10BC	SCREW	4	4X10(FOR CABNET BODY)
92	XTC4+10BC	SCREW	4	4X10(FOR CABNET BODY)
92	XTC4+10BC	SCREW	4	4X10(FOR CABNET BODY)
93	XTC4+10FC	SCREW	1	4X10(FOR LAMP COVER)
94	XTC4+12BK	SCREW(BLACK)	2	4X12(FOR BASE)
94	XTC4+12BK	SCREW(BLACK)	2	4X12(FOR BASE)
95	XTT4+8E	SCREW	1	4X8(FOR BACK PANEL COVER)
96	XWC4BPN	WASHER	2	FOR BACK PANEL COVER LAMP COVER)
96	XWC4BPN	WASHER	2	FOR BACK PANEL COVER LAMP COVER)
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
97	XYD4+EE12F	SCREW	11	NE-2156,NE-1656(4X12)FOR MOUNTING BRACKET, / DIODE ,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER ,BASE METAL,WASHER
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
97	XYD4+EE12F	SCREW	10	NE-2146(4X12)FOR MOUNTING BRACKET, / DIODE,CAPACITOR BRACKET,AC CORD, / ANTENNA MOTOR COVER,BASE METAL
98	XSWANE5+10U	SCREW	4	5X10(FOR HINGE)
98	XSWANE5+10U	SCREW	4	5X10(FOR HINGE)
99	A10923310GP	INTERRUPTION COVER B	1	
100	A61713A80BP	INSULATION SHEET D	1	
101	A1007-3280	FOOT A	4	
101	A1007-3280	FOOT A	4	
101	A1007-3280	FOOT A	4	
101	A1007-3280	FOOT A	4	

NOTE: Please order name label together.

15. DOOR ASSEMBLY

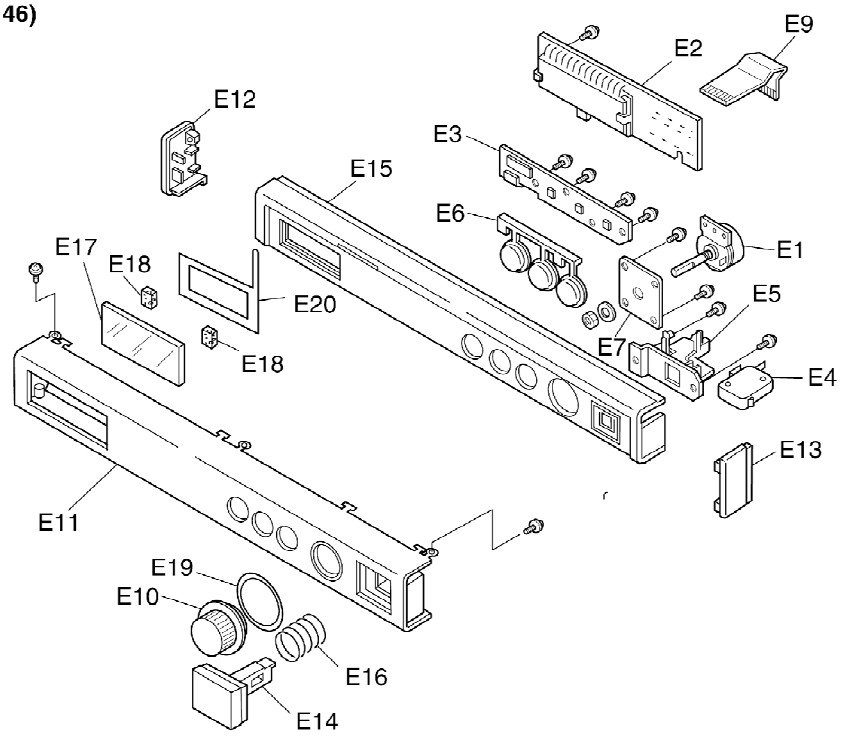


(S-3A8 BPQ)

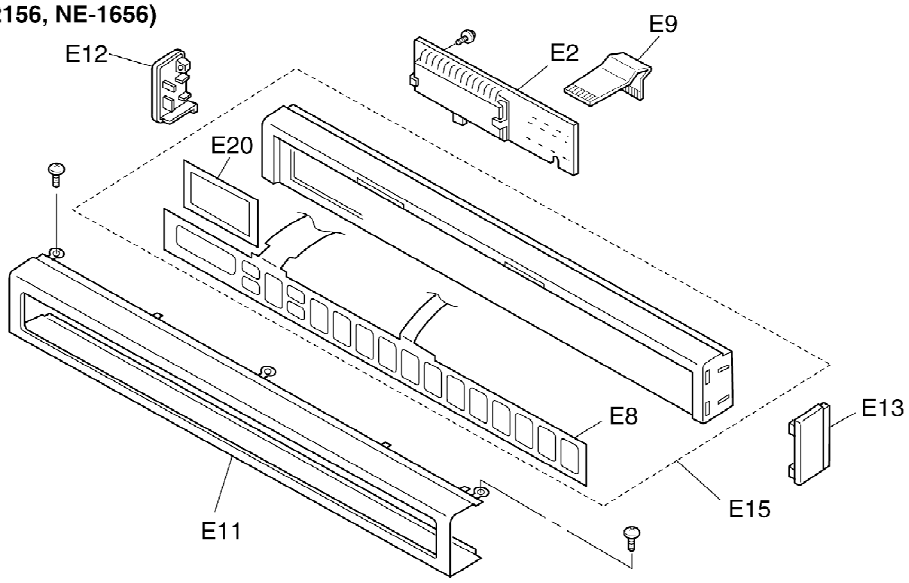
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
D1	ANE3003-3510	DOOR FRAME(U)	1	
D2	ANE30078U0AP	HINGE	2	
D2	ANE30078U0AP	HINGE	2	
D3	ANE301A8U0AP	DOOR A	1	
D4	ANE301H-3850	DOOR KEY LEVER B	1	
D5	ANE301Q-3500	DOOR E(U)	1	
D6	ANE3018-3850	DOOR KEY	1	
D7	ANE3019-3850	DOOR KEY B	1	
D8	ANE30218U0AP	DOOR KEY SPRING	1	
D9	ANE30562Q0AP	HANDLE PIN	2	
D9	ANE30562Q0AP	HANDLE PIN	2	
D10	A30703170GP	HANDLE PIECE A	1	
D11	ANE3081P60AP	DOOR HINGE SPACER	1	
D12	ANE30858U0AP	DOOR C	1	
D13	ANE31348U0AP	HANDLE PIECE B	1	
D14	ANE3145-3500	DOOR SCREEN A	1	
D15	ANE31468U0AP	DOOR SCREEN B	1	
D16	XYE4+C16TS	SCREW	2	4X16(FOR DOOR E)
D16	XYE4+C16TS	SCREW	2	4X16(FOR DOOR E)

16. ESCUTCHEON BASE ASSEMBLY

(NE-2146)



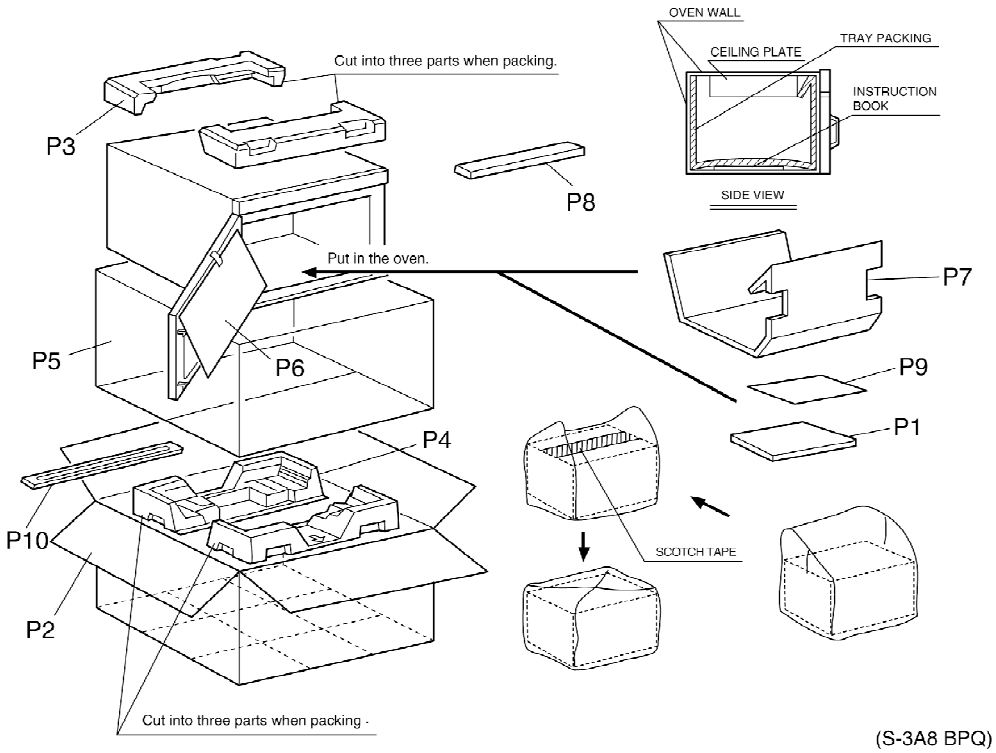
(NE-2156, NE-1656)



(S-3A8 BPQ)

Ref. No.	Part No.	Part Name & Description	Pcs\Set	Remarks
E1	ANE03558Y0BP	TIMER	1	NE-2146
E2	A603M3310GP	P.C.BOARD B(U)	1	
E2	A603M3310GP	P.C.BOARD B(U)	1	
E3	ANE605Q8Y0BP	P.C.BOARD F(U)	1	NE-2146
E4	ANE61424L0AG	MICROSWITCH	1	⚠NE-2146(V-16G-3C26)
E5	ANE61628Y0BP	START SWITCH BRACKET	1	NE-2146
E6	ANE62648Y0BP	SELECT SWITCH BUTTON	1	NE-2146
E7	ANE63438Y0BP	TIMER BRACKET	1	NE-2146
E8	A64793310GP	MEMBRANE SWITCH	1	⚠NE-2156,NE-1656
E9	A6590-3280	FLAT CABLE	1	
E9	A6590-3280	FLAT CABLE	1	
E10	ANE800D8Y0BP	TIMER KNOB	1	NE-2146
E11	ANE801N8Y0BP	ESCUTCHEON A(U)	1	NE-2146
E11	ANE801N8U0AP	ESCUTCHEON A(U)	1	NE-2156,NE-1656
E12	ANE80028U0AP	ESCUTCHEON B	1	
E12	ANE80028U0AP	ESCUTCHEON B	1	
E13	ANE80068U0AP	ESCUTCHEON D	1	
E13	ANE80068U0AP	ESCUTCHEON D	1	
E14	ANE803X8Y0BP	START BUTTON	1	NE-2146
E15	ANE80348Y0BP	ESCUTCHEON BASE	1	NE-2146
E15	A800D3310GP	ESCUTCHEON BASE(U)	1	NE-2156,NE-1656
E16	ANE80378Y0BP	COOK BUTTON SPRING	1	NE-2146
E17	A81263320GP	SMOKE PANEL	1	NE-2146
E18	ANE0921000BA	CUSHION RUBBER C	1	NE-2146
E18	ANE0921000BA	CUSHION RUBBER C	1	NE-2146
E19	ANE82878Y0BP	SPACER A	1	NE-2146
E20	A83373320GP	ESCUTCHEON SHEET	1	NE-2146
E20	A8337-3280	ESCUTCHEON SHEET	1	NE-2156,NE-1656

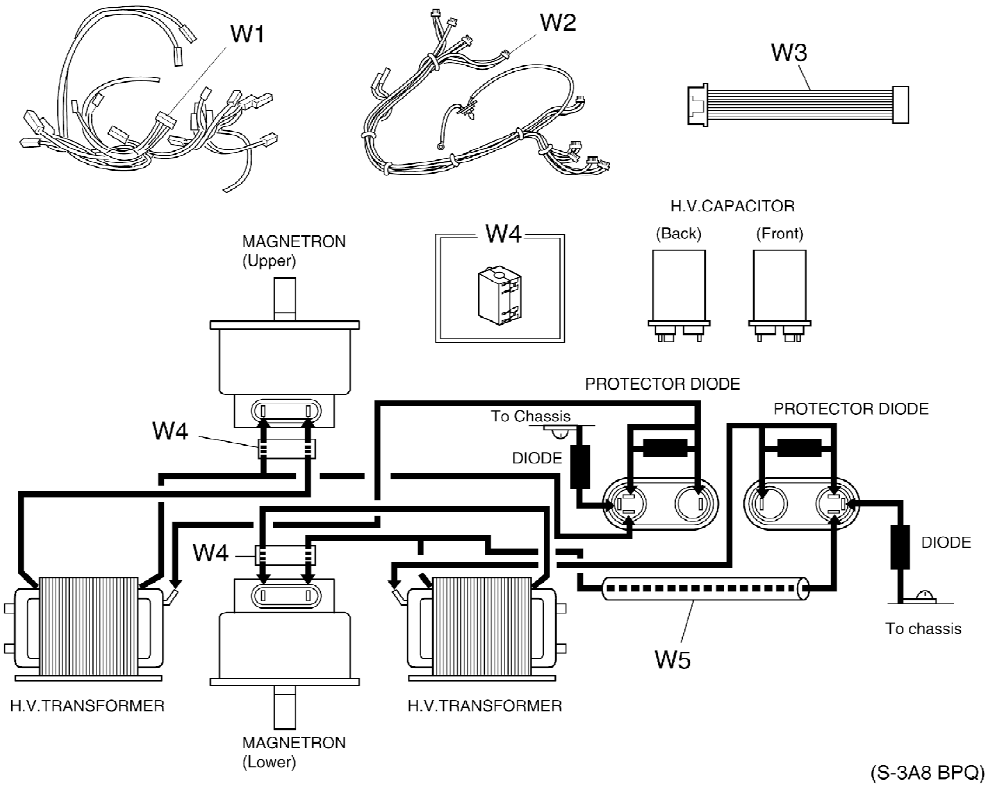
17. PACKING AND ACCESSORIES



(S-3A8 BPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	A00033A80BP	INSTRUCTION BOOK	1	BPQ
P1	A00033A80EU	INSTRUCTION BOOK	1	EUG
P2	A01023A80BP	PACKING CASE,PAPER	1	NE-2156
P2	A01023A90BP	PACKING CASE,PAPER	1	NE-2146
P2	A01023A30EU	PACKING CASE,PAPER	1	NE-1656
P3	ANE01048U0AP	UPPER FILLER	1	
P4	ANE01058U0AP	LOWER FILLER	1	
P5	A01065200AP	VINYL COVER	1	
P6	ANE01072Q0AP	DOOR SHEET	1	
P7	A01083310GP	TRAY PACKING	1	
P8	A01453230BP	DOOR SHEET B	1	
P9	A04203310BP	OPERATING GUIDE	1	NE-2156,NE-1656
P10	A1134-3280	FOOT BRACKET	1	

18. WIRING MATERIAL



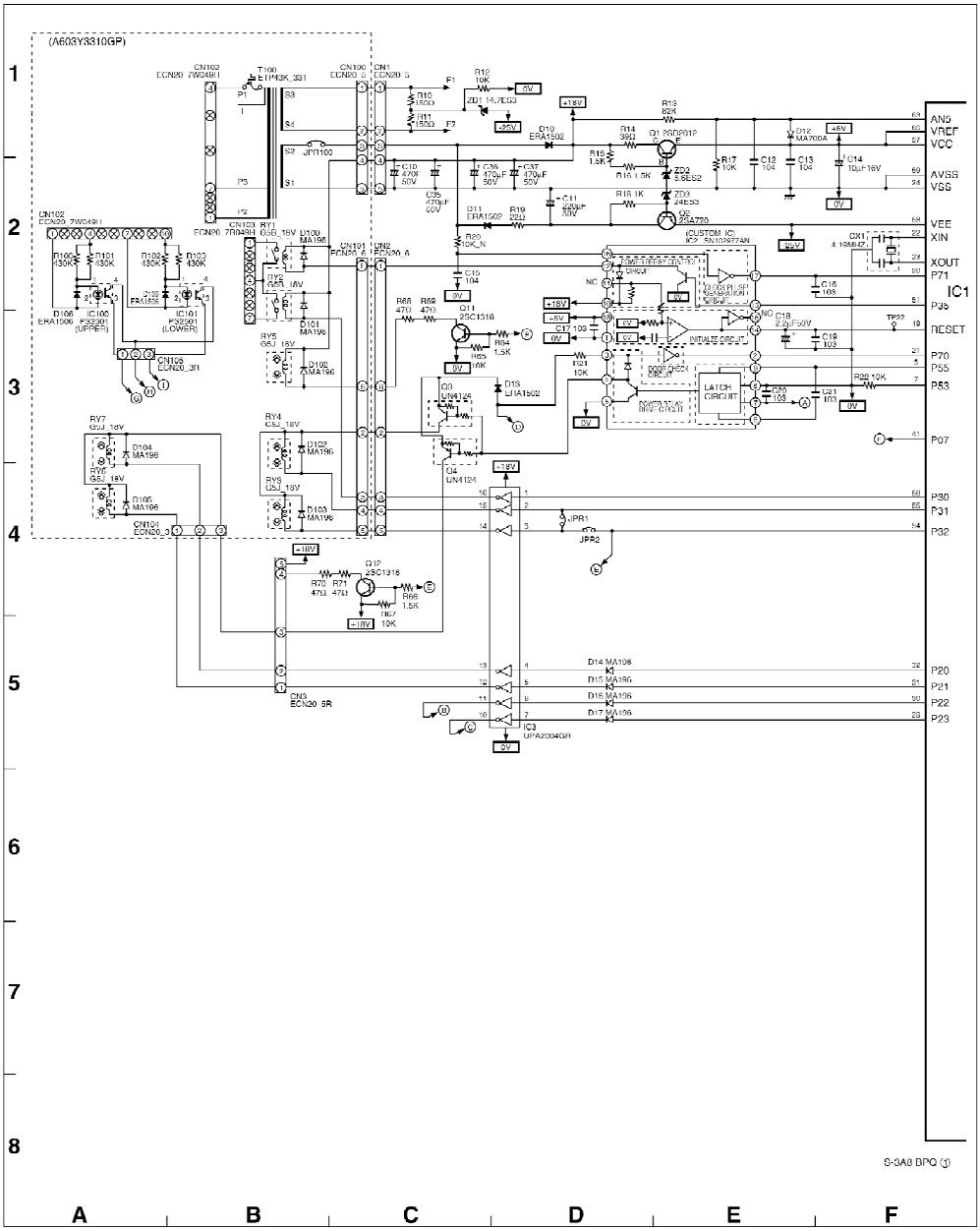
(S-3A8 BPQ)

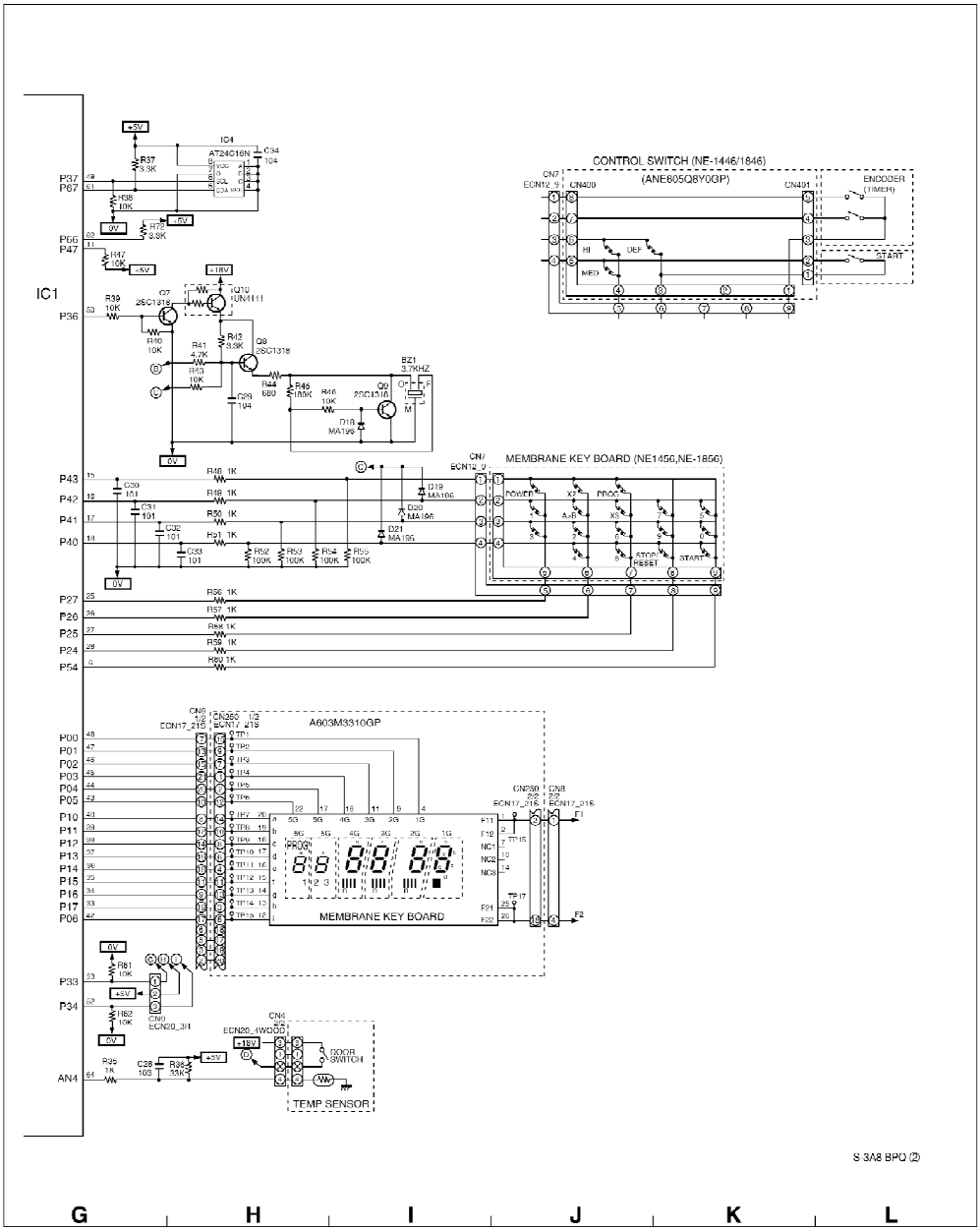
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	A030A3310GP	LEAD WIRE HARNESS	1	
W2	A030H3310GP	LEAD WIRE HARNESS	1	
W3	A03543320GP	LEAD WIRE	1	NE-2146
W4	A50966520UP	FERRITE CORE	2	
W4	A50966520UP	FERRITE CORE	2	
W4	A50966520UP	FERRITE CORE	2	
W5	A61393230BP	INSULATION TUBE	1	

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Rema
		REF NO. 83 NOISE FILTER (U)		
C1	ECQE2A474MWA	POLYESTER CAPACITOR	1	0.47MF,250V,±20%
C2,C3	ANE6169A20GN	CAPACITOR	2	0.022MF,250V,±20%
CN10	AEEMMD00703W	CONNECTOR	1	3PIN
D1	ERZC10DK621F	VARISTOR	1	
D2,D3	ERZC10DK112R	VARISTOR	2	
F1,F2	A62316010BP	FUSE HOLDER	4	
F3	A62316000GP	FUSE HOLDER	2	
L1	A621A3310GP	FILTER COIL	1	
R1	ERF15ZXJ240	RESISTOR	1	24 Ω ,15W,±5%
		REF NO. 82 L.V.TRANSFORMER (U)		
	ANE61158U0AP	POWER RELAY BRACKET	1	
	ANE65448U0AP	SPACER A	6	
	ANE65458U0AP	SPACER B	2	
	A6338-3280	INSULATION SHEET B	1	
	XYN3+F25S	SCREW	2	3X25
CN100	AEEMMF01F05W	CONNECTOR	1	5PIN
CN101	AEEMMF03F06W	CONNECTOR	1	6PIN
CN102	AEEMMD04907W	CONNECTOR	1	7PIN
CN103	AEEMMD04907R	CONNECTOR	1	7PIN
CN104	AEEMMF00703W	CONNECTOR	1	3PIN
CN105	AEEMMF00703R	CONNECTOR	1	3PIN
CN106	AEEMMD24910W	CONNECTOR	1	10PIN
D100,D101, D102,D103, D104,D105, D108	MA196-(TA5)	DIODE,SI	7	
D106,D107	AEDNERA1506	DIODE,SI	2	
IC100,IC101	AEICP25011HL	L.S.I	2	
R100,R101 , R102,R103	ERDS1TJ434T	CARBON FILM RESISTOR	4	430K Ω ,1/2W,±5%
RY1	AEBG5B18P-1	POWER RELAY	1	⚠18V
RY2	AEBG5B1E18	POWER RELAY	1	⚠18V
RY3,RY4,RY5	AEG5J1EM18B	POWER RELAY	5	⚠18V
T100	ETP43KZN61CN	L.V.TRANSFORMER	1	
		REF NO.E2 P.C.BOARD B (U)		
	ANE82848U0AP	SPACER CUSHION	1	
CN250	AEEMHLEM21S	CONNECTOR	1	21PIN
DISP250	A64563080AP	FLUORESCENT TUBE	1	
		REF NO.E3 P.C.BOARD F (U)		
CN400	AEEMS08BEH	CONNECTOR	1	8PIN
CN401	AEEMS05BEH	CONNECTOR	1	5PIN
SW400, SW401, SW402	EVQQTG05G	SWITCH	3	

19. DIGITAL PROGRAMMER CIRCUIT

SCHEMATIC DIAGRAM


(A603Y3310GP)
IC1
AN9
VREF
VCC
AVSS
VSS
VEE
XIN
XOUT
P71
P35
RESET
P70
P55
P53
P07
P30
P31
P32
P20
P21
P22
P23
S-3A8 BPQ (1)
A
B
C
D
E
F



20. DIGITAL PROGRAMMER CIRCUIT

PARTS LIST

Ref. No.	Part No.	Description	Pcs/set	Remarks
BZ1	EFBRL37C20	BUZZER	1	3.7KHZ
C10,C35,C36,C37	ECA1HM471B	ELECTROLYTIC CAPACITOR,AL	4	470MF/50V
C11	ECA1HM221B	ELECTROLYTIC CAPACITOR,AL	1	220MF/50V
C12,C13, C15,C22, C25,C27, C28,C29, C34	AECF50F104Z	CERAMIC CAPACITOR	9	0.1MF/50V
C14	ECEA1CKA100B	ELECTROLYTIC CAPACITOR,AL	1	10MF/16V
C16,C17,C19,C20,C21	ECBT1E103ZF5	CERAMIC CAPACITOR	5	0.01MF/25V
C18	ECEA1HKA2R2B	ELECTROLYTIC CAPACITOR,AL	1	2.2MF/50V
C23,C24,C26, C30,C31,C32, C33	ECBT1H101KB5	CERAMIC CAPACITOR	7	0.0001MF/50V
CN1	AEEMMF01F05W	CONNECTOR	1	5PIN
CN2	AEEMMF03F06W	CONNECTOR	1	6PIN
CN3	AEEMMF01F05R	CONNECTOR	1	5PIN RED
CN4	AEEMMF00D04W	CONNECTOR	1	4PIN
CN7	AEEMMD1FF09W	CONNECTOR	1	NE-1446,NE-1846 9PIN
CN7	AEEM09FDZBTM	CONNECTOR	1	NE-1456,NE-1856
CN8	AEEMHLEM21S	CONNECTOR	1	
CN9	AEEMMF00703R	CONNECTOR	1	3PIN RED
CX1	EFOGC4194T4	RESONATOR	1	4.19MHZ
D10,D11,D13	AEDNERA1502	DIODE,SI	3	1.0A
D12	MA700A-(TA)	DIODE,SI	1	0.03A
D14,D15,D16, D17,D18,D19, D20,D21	MA196-(TA5)	DIODE,SI	8	0.1A
IC1	AEIC38122256	L.S.I	1	
IC2	AEIC102977AN	IC	1	AN6752
IC3	AEICU2004GR	IC	1	
IC4	AEICAT24C16N	IC	1	
Q1	AEGHPH0124BS	POWER RELAY	1	⚠
Q1	2SD2012	TRANSISTOR,SI,2W	1	3MHZ
Q2,Q5	2SA720PRTA	TRANSISTOR,SI,400MW	2	200MHZ
Q3,Q4	UN4124-(TA)	TRANSISTOR,SI,300MW	2	
Q6,Q7,Q8,Q9, Q11,Q12	2SC1318QSTA	TRANSISTOR,SI,400MW	6	200MHZ
Q10	UN4111-(TA)	TRANSISTOR,SI,300MW	1	
R10,R11	ERDS2TJ151T	CARBON FILM RESISTOR	2	150 Ω ,1/4W,5%
R12,R17,R21, R22,R23,R25, R27,R34,R38, R39,R40,R46, R47,R61,R62, R63,R65,R67	ERDS2TJ103T	CARBON FILM RESISTOR	18	10K Ω ,1/4W,5%
R13	ERDS2TJ823T	CARBON FILM RESISTOR	1	82K Ω ,1/4W,5%
R14	ERDS2TJ390T	CARBON FILM RESISTOR	1	39 Ω ,1/4W,5%
R15,R16,R32,R64,R66	ERDS2TJ152T	CARBON FILM RESISTOR	5	1.5K Ω ,1/4W,5%
R18,R24,R26, R28,R29,R30, R31,R35,R43, R48,R49,R50, R51,R56,R57, R58,R59,R60	ERDS2TJ102T	CARBON FILM RESISTOR	18	1.0K Ω ,1/4W,5%
R19	ERDS2TJ220T	CARBON FILM RESISTOR	1	22 Ω ,1/4W,5%

Ref. No.	Part No.	Description	Pcs/set	Remarks
R20	ERDS2FJ103T	CARBON FILM RESISTOR	1	10K Ω ,1/4W,5%
R33,R44	ERDS2TJ681T	CARBON FILM RESISTOR	2	680 Ω ,1/4W,5%
R36	ERDS2TJ333T	CARBON FILM RESISTOR	1	33K Ω ,1/4W,5%
R37,R42,R72	ERDS2TJ332T	CARBON FILM RESISTOR	3	3.3K Ω ,1/4W,5%
R41	ERDS2TJ472T	CARBON FILM RESISTOR	1	4.7K Ω ,1/4W,5%
R45	ERDS2TJ184T	CARBON FILM RESISTOR	1	180K Ω ,1/4W,5%
R52,R53,R54,R55	ERDS2TJ104T	CARBON FILM RESISTOR	4	100K Ω ,1/4W,5%
R68,R69,R70,R71	ERDS2TJ470T	CARBON FILM RESISTOR	4	47 Ω ,1/4W,5%
ZD1	AEDZ4R7ES3T1	ZENER DIODE,SI	1	
ZD2	AEDZ5R6ES2T1	ZENER DIODE,SI	1	
ZD3	AEDZ24ES3T1	ZENER DIODE,SI	1	